

Science-Based Prevention of Youth Sports Injuries



Steve Marshall

**Epidemiologist & Biostatistician, UNC Injury Prevention Research Center
Associate Professor, Depts of Epidemiology, Orthopedics, & Exercise and Sport Science
University of North Carolina at Chapel Hill**

Email: SMarshall@unc.edu Voice: 919-966-1320

Outline

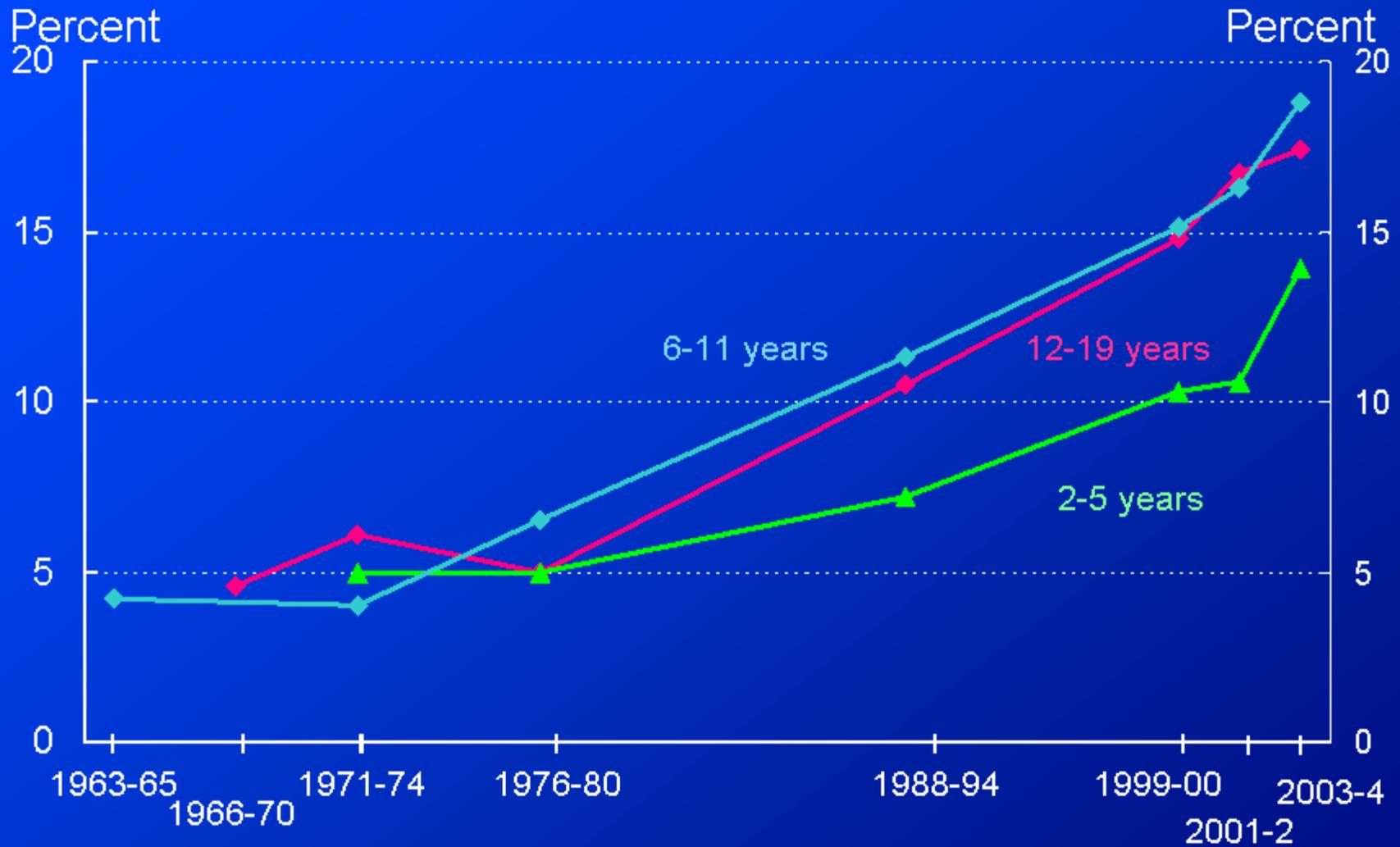
➤ 1: *Youth Sports Injury*

- Sport: A Vaccine for Childhood Obesity
- Sports Injury: How Big is the Problem?
- Physical Activity Promotion needs Injury Prevention

➤ 2: *Prevention Strategies*

- Bicycle Helmets
- Mouthguards
- ACL & Other Serious Knee/Ankle Injuries
- Concussion
- Resources for High Schools
- Certified Athletic Trainers

Trends in Child and Adolescent Overweight



Note: Overweight is defined as BMI \geq gender- and weight-specific 95th percentile from the 2000 CDC Growth Charts.
Source: National Health Examination Surveys II (ages 6-11) and III (ages 12-17), National Health and Nutrition Examination Surveys I, II, III and 1999-2004, NCHS, CDC.

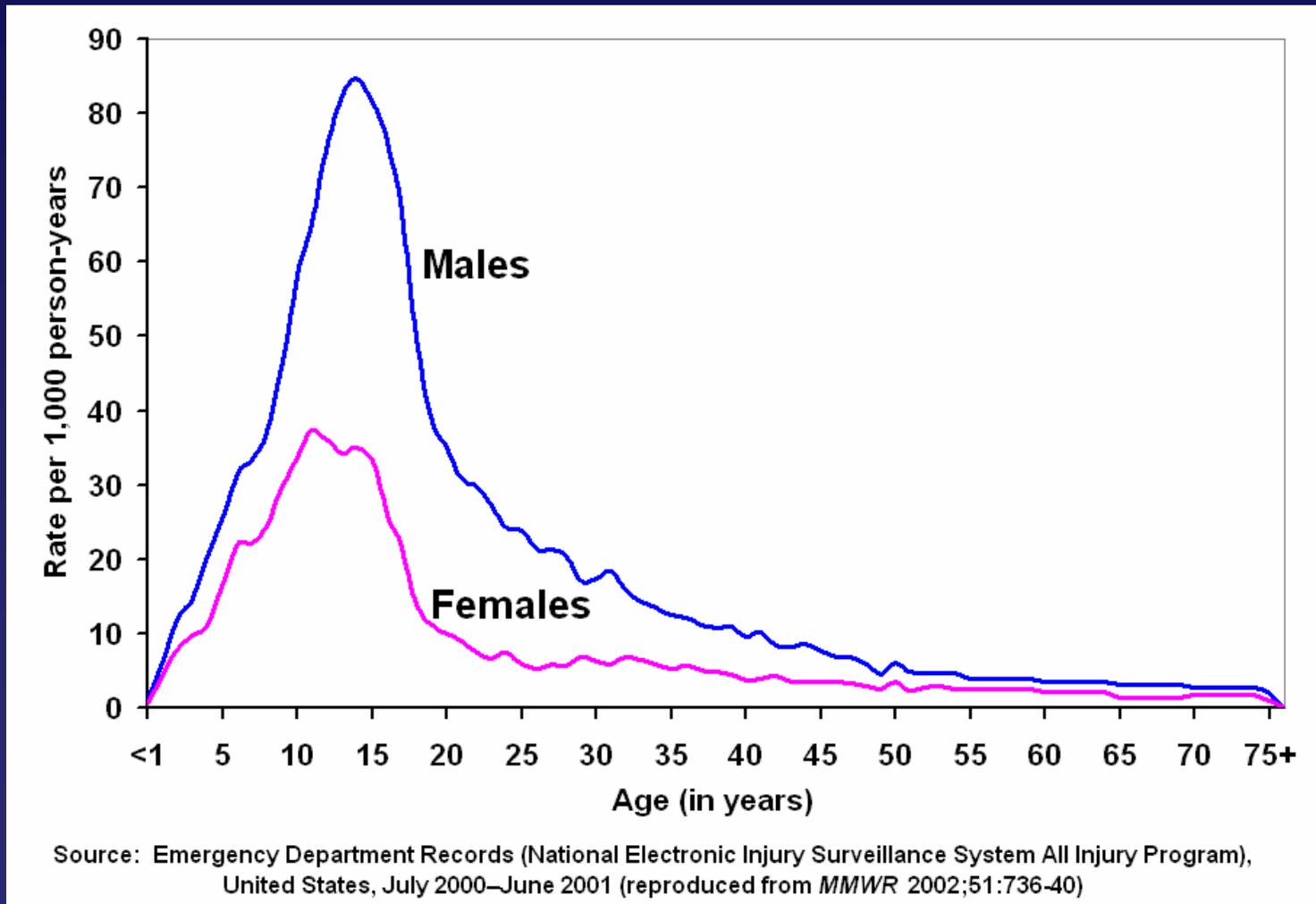
Sports Are Important For Kids

Sports and recreational physical activity is an important part of a healthy lifestyle

- Reduces obesity & related chronic disease, e.g. diabetes
 - Cardiorespiratory benefits
 - Self-image and self-esteem
 - Learning to be Part of a Team
- But Kids can't play if they are injured!
- Sports Injuries are preventable
 - NOT “part of the game”



Sports and Recreational Injury Emergency Depts – National Data



How Big is the Problem?

NATIONALLY

- Boys 10-14 yrs
 - 52% of ED visits for unintentional injuries are due to sport & recreation

- Girls 10-14 yrs
 - 38% of ED visits for unintentional injuries are due to sport & recreation

- **4 million ED visits annually for sports & recreation injuries (all age groups combined)**

How Big is the Problem?

NORTH CAROLINA EMERGENCY ROOMS

ED visits for sport & recreation injuries in NC

- 123,000 per year

- 53% in youth < 18 years
 - 66,000 per year

- 66% in youth < 25 years
 - 82,000 per year

Estimated from national data based on NC demographics

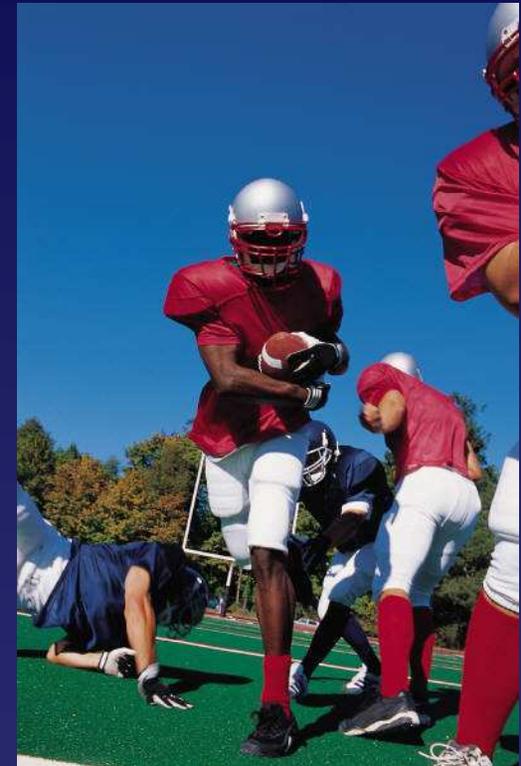
North Carolina High Schools

NC high school athletes

- 175,582 athletes
- $\frac{2}{3}$ play >1 sport
- 10,000 injuries per year

Average injury risk for 1 sport

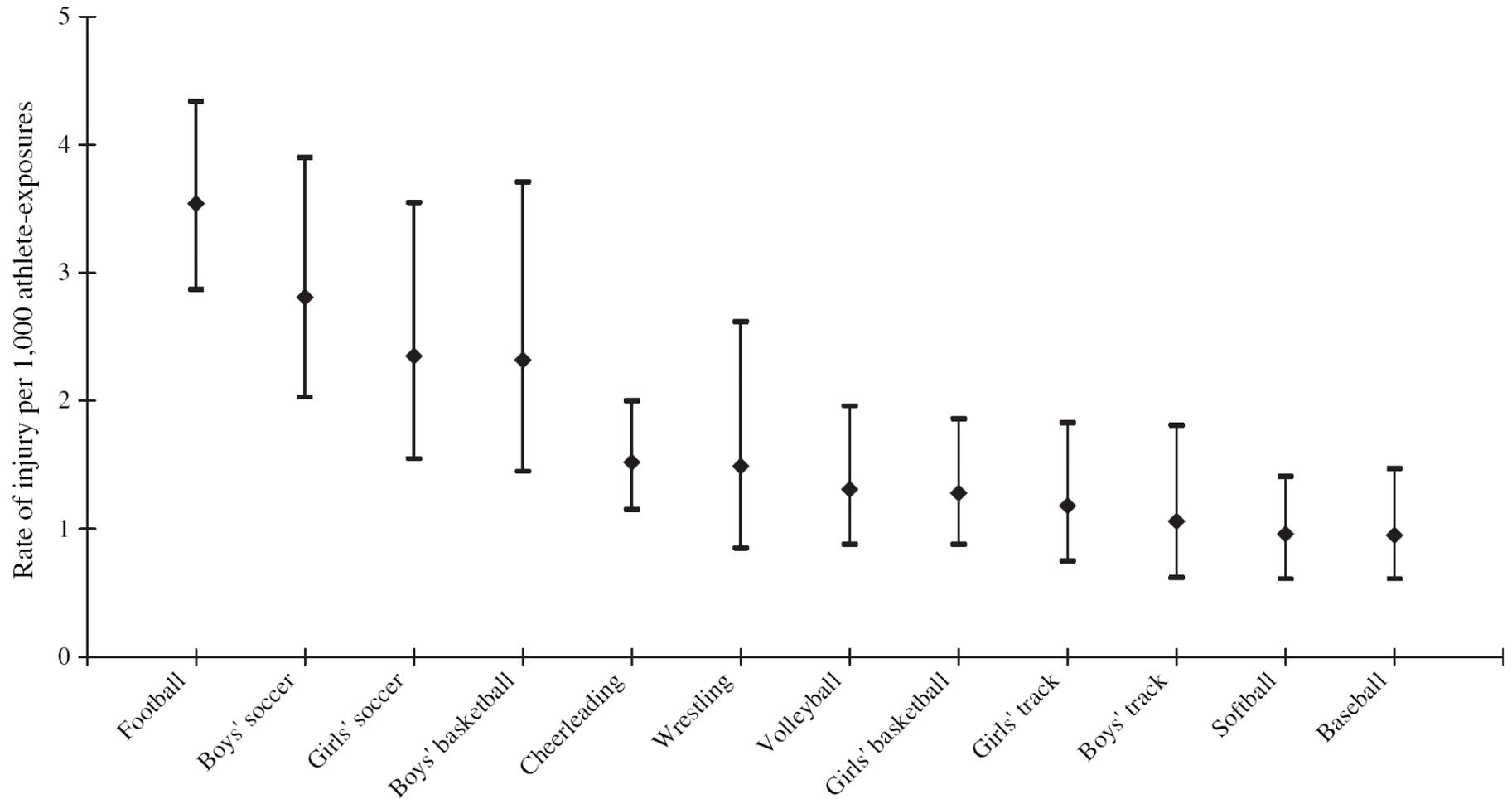
- 1 in 20 per season
- 1 in 5 over 4 years



Knowles SB et al. A prospective study of injury incidence among North Carolina high school athletes. *Am J Epidemiol.* 2006;164:1209-1221

Marshall SW, Golightly YM. Sports injury and arthritis. *NC Med J.* 2007;68(6):430-433

NC High Schools: Rates by sport

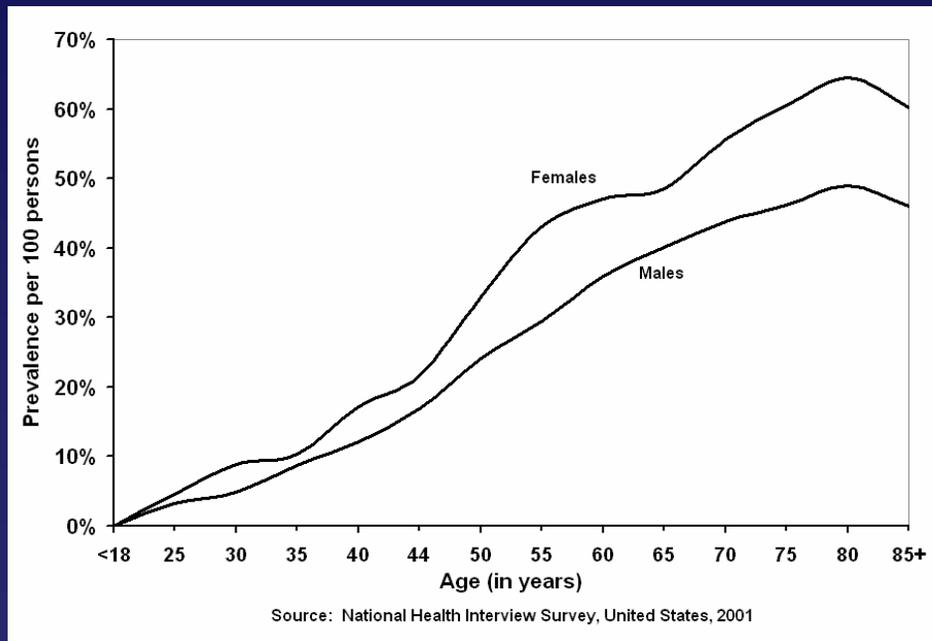


Knowles SB et al. A prospective study of injury incidence among North Carolina high school athletes. *Am J Epidemiol.* 2006;164:1209-1221

Injury is the single biggest reason people stop exercising

- **Cooper Clinic study of 5,000 adults 20-85 yrs**
 - **21% reported an activity-related injury in previous 12 months**
 - **31% of injured men permanently stopped their exercise program**
 - **24% of injured women permanently stopped their exercise program**

Osteoarthritis from early-life injury is a major limitation that prevents older adults from exercising

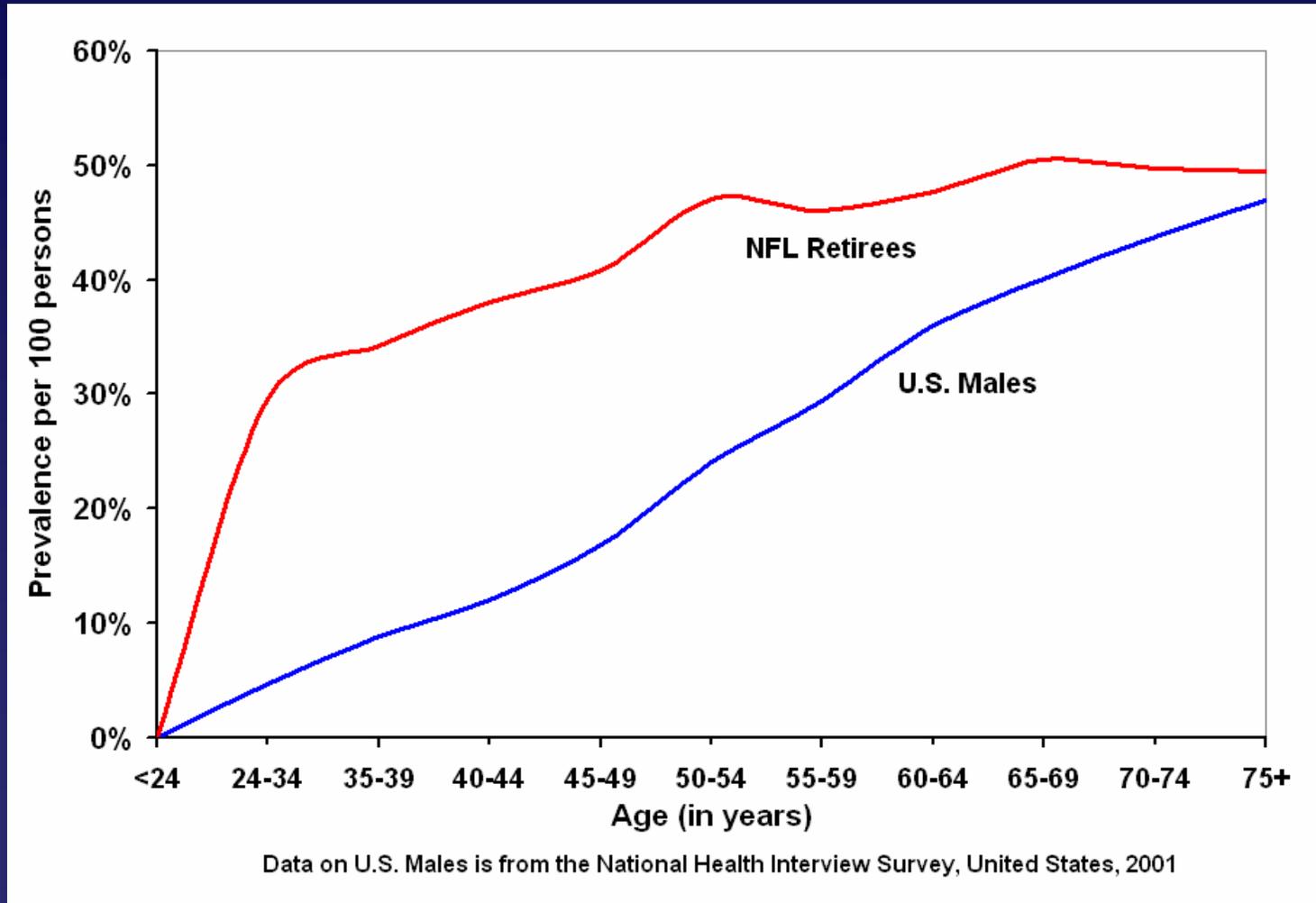


Prevalence of Arthritis in the US, 2001

“... based on the available evidence, it appears that programs addressing the prevention and care of sports injury will pay dividends in terms of preventing early onset of osteoarthritis.”

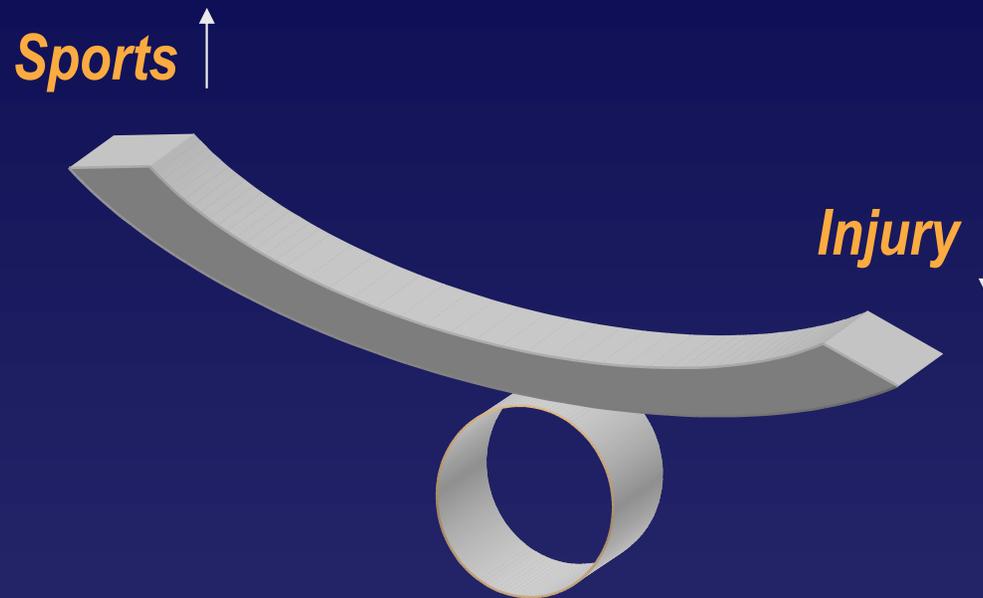
Marshall SW, Golightly YM. Sports injury and arthritis. *NC Med J.* 2007;68(6):430-433

Injury + Weight = OsteoArthritis



Prevalence of Arthritis in US Males and retired NFL footballers

More Sport + Less Injury = Better Health



I work with sports organization like USA Baseball to increase participation by making the game safer

Management of **injury risk** is the **key** to successfully promoting **physical activity** and reducing **chronic disease**

Promotion of Physical Activity without Injury Prevention is a BIG MISTAKE

- Won't realize effective long-term gains in chronic disease reduction
- More Sport & Less Injury = Health Benefit
- More Sport & More Injury = Waste of Time

What will you say in your report?

Outline

➤ 1: *Youth Sports Injury*

- Sport: A Vaccine for Childhood Obesity
- Sports Injury: How Big is the Problem?
- Physical Activity Promotion needs Injury Prevention

➤ 2: *Prevention Strategies*

- Bicycle Helmets
- Mouthguards
- Prevent ACL & Other Serious Knee Injury
- Management of Concussion
- Resources for High Schools
- Certified Athletic Trainers

Criteria for a Prevention Strategy

➤ Effectiveness

- Strong Evidence
- Sufficient Evidence
- Promising Practice
- Insufficient Evidence
- Not Recommended

➤ Importance

- What pct of injuries would be prevented

➤ Viability

- Socially acceptable
- Economically feasible

Prevention Strategy #1 Bicycle Helmets



Where's my
helmet?

Bicycle Helmets

- Strong Evidence
 - Bicycle helmets reduce the risk of head injury by 80%
- Important
 - 70% of fatal bicycle crashes involve head injury
 - 1000 police-reported bicycle crashes per year in NC
- Viable
 - State law requires helmet use under age 16
 - Only 16% statewide for under age 16 (2002 data)
 - Parental fine of \$10, but rarely enforced (if ever)
 - For all ages: 24% statewide (2002 data)
 - Law increased wearing rates in ADULTS!

Increasing Use of Bicycle Helmets

- Increase awareness
 - Importance of head injury
 - Importance of good fit
 - Media, bike rodeos
- Increase ownership
 - \$10 state mail rebate
- Increase wearing
 - Requiring adult use will increase wearing rates in kids
 - Enforcement campaigns
 - Similar to “click it or ticket”
 - Warnings/Fines for parents of child non-wearers
 - Rewards for wearers and parents of wearers
 - Feedback data on wearing rates through media

Prevention Strategy #2

Mouthguards



Mouthguards

- Strong Evidence
 - Mouthguards prevent tooth, mouth, and lip injury
 - Prevent 50% of dental injuries
- Important
 - High levels of disfigurement
- Viable
 - Required in football
 - Infrequent use in many other sports
 - ✦ Soccer, basketball

Three types of mouthguard

- **Ready-Made, Stock**
 - **Least comfortable**
- **Mouth-Formed, “Boil-and-Bite”**
 - **Inexpensive, sometimes uncomfortable**
- **Custom-Made**
 - **Most expensive, most comfortable**

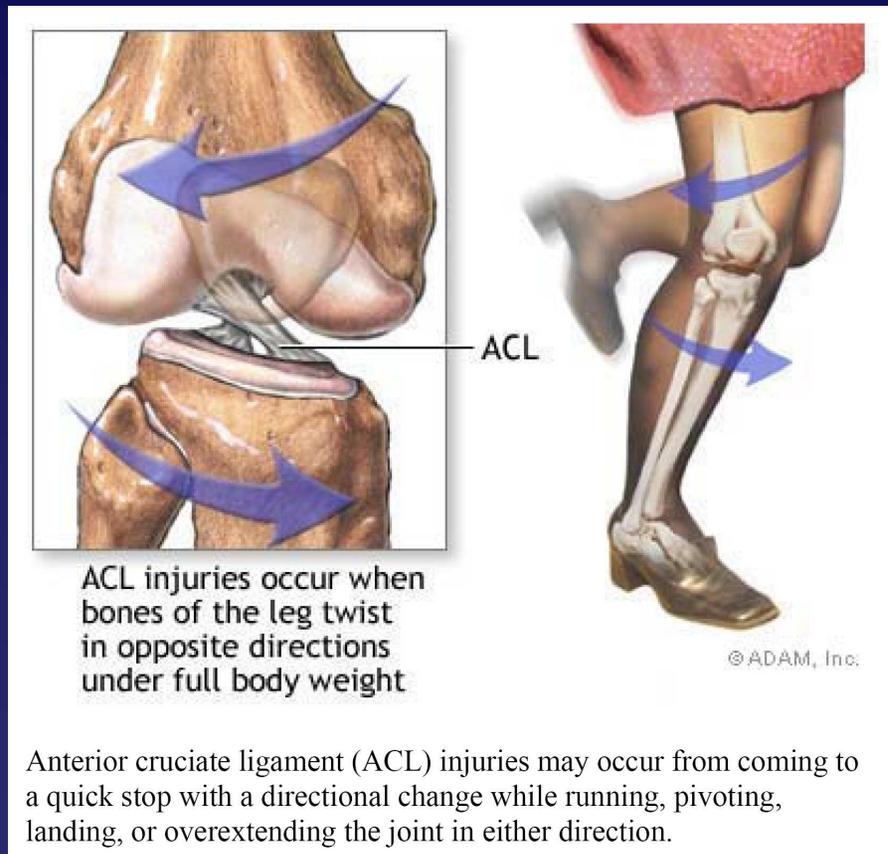


Increasing Mouthguard Use

- Increase awareness
 - NC Dental Assn
 - Target Partners: Parks and Rec Depts, Sports Clubs, High Schools
 - What types and where to buy
- Increase ownership
 - On-site Giveaways
 - On-site Experts to do Fittings
- Increase wearing
 - Use Coaches and ADs

Prevention Strategy #3

ACL & Other Serious Knee Injury

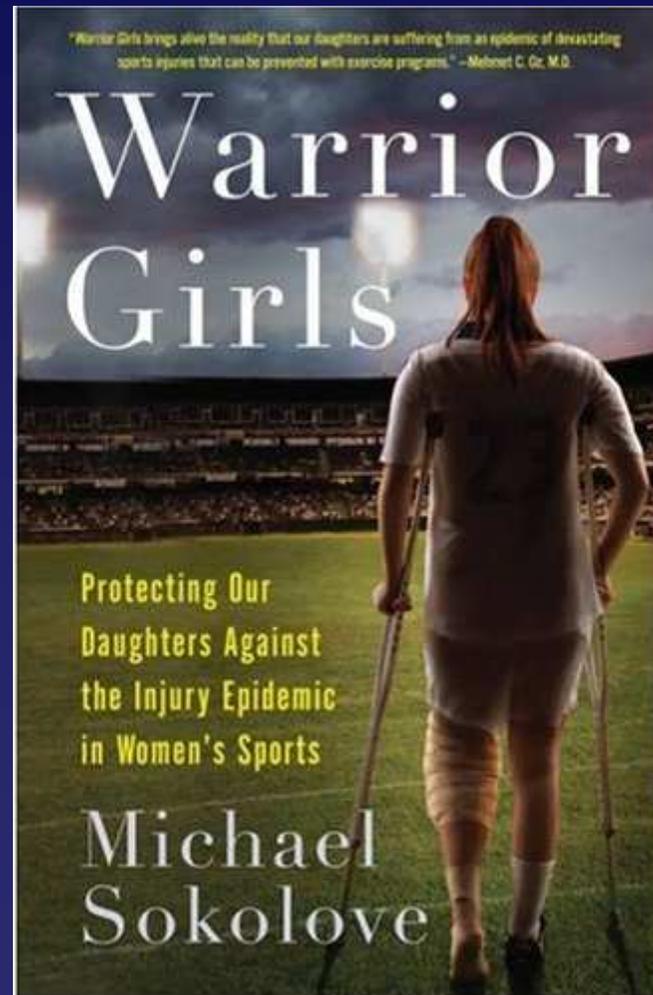


**Gina Kolata. "Big-Time Injury".
New York Times Magazine, 2-18-2008.**

Anterior Cruciate Ligament (ACL) Injuries in NC

- 3,000 ACL tears annually in NC (estimate)
- Surgery often required
- High levels of disability
- 6 month rehab
- Speeds the progression to osteo-arthritis
 - 80% within 15 years

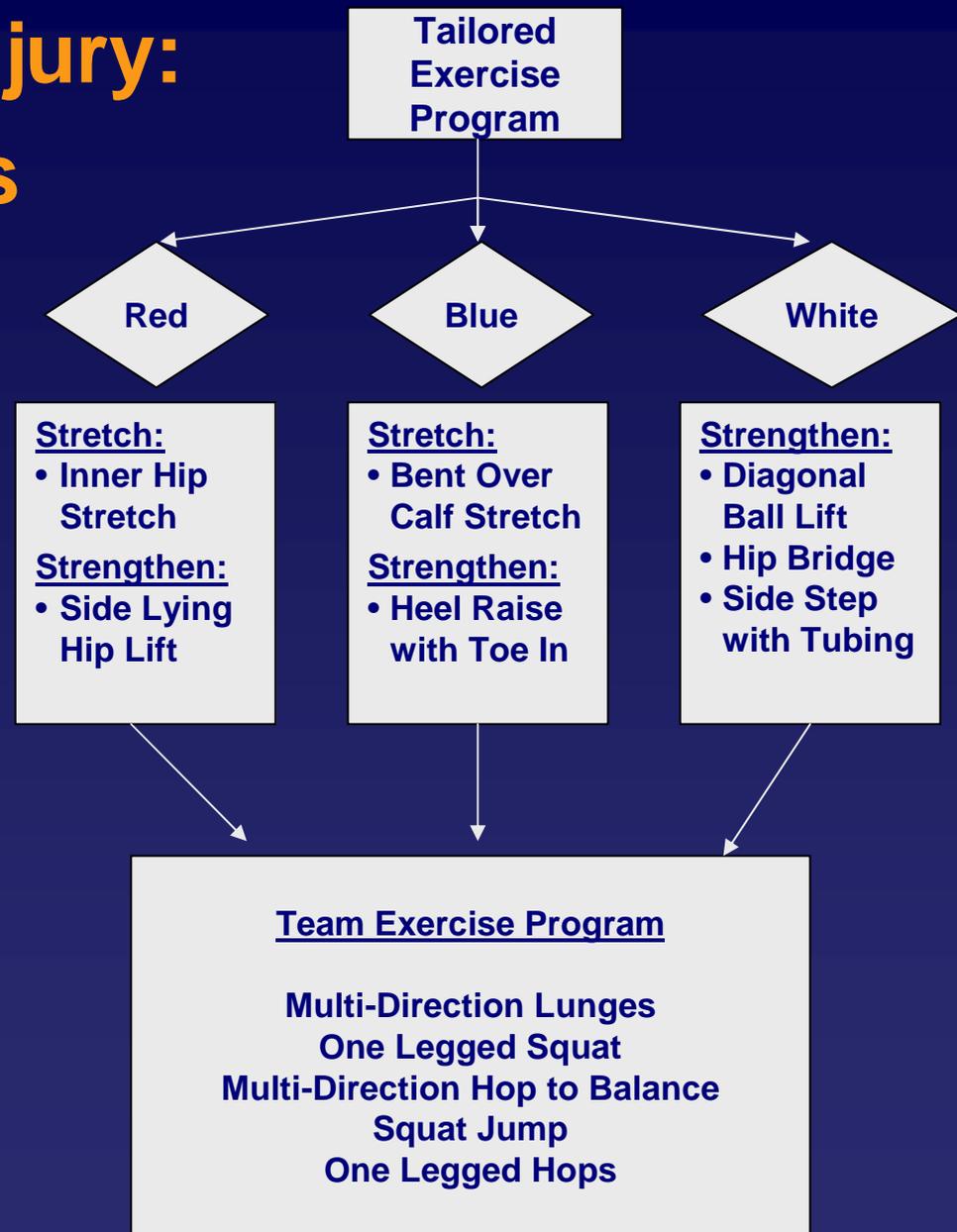
Everything you NEVER wanted to know about ACL injury...



Preventing ACL injury: Training Programs

Youth athletes can be given programs to strengthen core muscles, build motor control, and teach correct biomechanics when running and jumping

These programs are being used in soccer leagues in the Triangle region



ACL and other serious knee injury

- Sufficient Evidence
 - Training programs decrease ACL injury by 90%
 - Prevent 50% of knee/ankle injuries
- Important
 - ACL injury leads to later life osteo-arthritis, reducing physical activity and increasing chronic disease
- Viable
 - Currently in use in local soccer leagues

Increasing Use of Training Programs

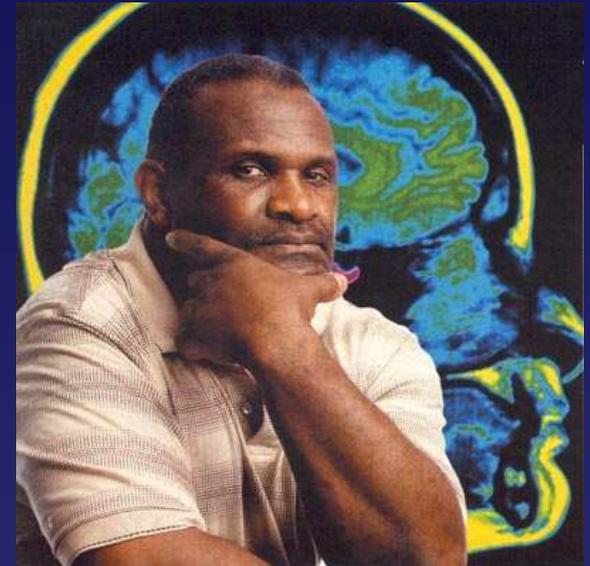
- Increase awareness
 - Easy to do
 - ✦ ACL is every parents nightmare
- Increase outreach
 - Coaches and athletes can be readily trained in programs
 - Programs substitute for usual warmup
 - Do the programs on an on-going basis
- Increase use of programs
 - Only limitation is trained people to visits high schools, middle schools, and sports clubs
 - Minimum to cover the state: 6 fulltime people + travel

Prevention Strategy #4

Properly Manage Concussions

- Not Just a DING!
 - Concussion is a Brain Injury
 - Needs Careful Management
 - Goal: Prevent Re-injury

- Effects of Repeat Concussion
 - Depression
 - Early-Onset Dementia
 - Increased Aggression
 - Suicide?



Properly Manage Concussion

- Strong Evidence
 - Strong association between concussion history and repeat concussion
 - Twice as likely to have a second concussion once you have had the first
- Important
 - 80,000 sports-related concussions annually in NC (estimate)
- Viable
 - Understanding of what is a concussion
 - Awareness of importance of full recovery before return to play

CDC Toolkit: Increase Awareness Parents, Coaches, & Athletes





SIGNS AND SYMPTOMS*

These signs and symptoms may indicate that a concussion has occurred.

Signs Observed by Coaching Staff	Symptoms reported by Athlete
Appears dazed or stunned	Headache
Is confused about assignment	Nausea
Forgets plays	Balance problems or dizziness
Is unsure of game, score, or opponent	Double or fuzzy vision
Moves clumsily	Sensitivity to light or noise
Answers questions slowly	Feeling sluggish
Loses consciousness	Feeling foggy or groggy
Shows behavior or personality changes	Concentration or memory problems
Can't recall events prior to hit	Confusion
Can't recall events after hit	

*Adapted from: Lovell MR, Collins MW, Iverson GL, Johnston KM, Bradley JP. Grade 1 or "ding" concussions in high school athletes. The American Journal of Sports Medicine 2004;32(1):47-54.

February 2005

ACTION PLAN

If you suspect that a player has a concussion, you should take the following steps:

1. Remove athlete from play.
2. Ensure athlete is evaluated by an appropriate health care professional. Do not try to judge the seriousness of the injury yourself.
3. Inform athlete's parents or guardians about the known or possible concussion and give them the fact sheet on concussion.
4. Allow athlete to return to play only with permission from an appropriate health care professional.

IMPORTANT PHONE NUMBERS

Emergency Medical Services
Name: _____
Phone: _____

Health Care Professional
Name: _____
Phone: _____

School Staff Available During Practice
Name: _____
Phone: _____

School Staff Available During Games
Name: _____
Phone: _____

Concussion: New Sideline Tools

Concussion Symptom Inventory (CSI)

Randolph, Barr, McCrea, Millis, Guskiewicz, Hammeke, Kelly, 2005

Symptom	Absent	Present
HEADACHE	0	1
NAUSEA	0	1
BALANCE PROBLEMS/DIZZINESS	0	1
FATIGUE	0	1
DROWSINESS	0	1
FEELING LIKE "IN A FOG"	0	1
DIFFICULTY CONCENTRATING	0	1
DIFFICULTY REMEMBERING	0	1
SENSITIVITY TO LIGHT	0	1
SENSITIVITY TO NOISE	0	1
BLURRED VISION	0	1
FEELING SLOWED DOWN	0	1
TOTAL _____		

Concussion: New Sideline Tools

SAC

Standardized Assessment of Concussion FORM A

Name: _____
 Age: _____ Sex: _____ Examiner: _____
 Nature of Injury: _____
 Date of Exam: _____ Time: _____ Exam No. _____

1) ORIENTATION:

Month: _____ 0 1
 Date: _____ 0 1
 Day of week: _____ 0 1
 Year: _____ 0 1
 Time (within 1 hr.): _____ 0 1
Orientation Total Score _____ / 5

2) IMMEDIATE MEMORY: (all 3 trials are completed regardless of score on trial 1 & 2; score equals sum across all 3 trials)

List	Trial 1	Trial 2	Trial 3
Elbow	0 1	0 1	0 1
Apple	0 1	0 1	0 1
Carpet	0 1	0 1	0 1
Saddle	0 1	0 1	0 1
Bubble	0 1	0 1	0 1
Total			

Immediate Memory Total Score _____ / 15

Note: Do not inform the subject that delayed recall will be tested.

NEUROLOGICAL SCREENING:

Loss of Consciousness (presence, duration)

Recollection of injury (pre- or post-traumatic amnesia)

Strength:

Sensation:

Coordination:

3) CONCENTRATION:

Digits Backward: (if correct, go to next string length. If incorrect, read trial 2. Stop after incorrect on both trials)

4-9-3 6-2-9 0 1
 3-8-1-4 3-2-7-9 0 1
 6-2-9-7-1 1-5-2-8-6 0 1
 7-1-8-4-6-2 5-3-9-1-4-8 0 1

Months in Reverse Order: (entire reverse sequence correct for 1 pt)

Dec-Nov-Oct-Sep-Aug-Jul 0 1
 Jun-May-Apr-Mar-Feb-Jan 0 1
Concentration Total Score _____ / 5

EXERTIONAL MANEUVERS

(when appropriate):

5 jumping jacks 5 push-ups
 5 sit-ups 5 knee-bends

4) DELAYED RECALL

Elbow 0 1
 Apple 0 1
 Carpet 0 1
 Saddle 0 1
 Bubble 0 1
Delayed Recall Total Score _____ / 5

SUMMARY OF TOTAL SCORES:

Orientation _____ / 5
Immediate Memory _____ / 15
Concentration _____ / 5
Delayed Recall _____ / 5

Overall Total Score _____ / 30

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Strategy #5

Resources for High Schools

- 10,000 high school sports injuries annually
- Numerous recommendations for high schools on how to reduce sports injuries
 - See handout
- Numerous proven sports injury interventions
 - See handout
- Follow model of 100% Tobacco-Free schools
 - Establish SportSmart Schools
 - Maximize sports participation
 - Minimize injury risk

Strategy #6

More Certified Athletic Trainers

- **National Athletic Trainers Association** www.nata.org
 - First Responders to Sports Injuries
 - Certified in Sports Medicine
 - Know Concussion Management
 - Know Injury Prevention
 - Know Knee Injuries
 - Work with other providers
 - 70% are Masters-level; CEUs required
- **ATCs in High Schools**
 - 58% of NC High Schools have access to an ATC
 - Can we make it 100%????

Thanks...

